

What Is Claimed Is:

1. A vial closure device for closing a mouth of a vial which in use contains one of a gas or a vapor to be analyzed by extraction through a gas sampling device which is connectable to an analytical instrument and is displaceable along a sampling axis, said vial closure device comprising:

a tubular body member having opposite ends and locatable in the mouth of the vial, said tubular body member having at one end an aperture through which gas may pass from the vial into said tubular body member, said tubular body member further comprising a valve seat;

a first seal for making a substantially gas-tight seal between said tubular body member and the vial;

a second seal arranged on said sampling axis at the other end of said tubular body member for providing a gas-tight seal around the gas sampling device inserted through said second seal into said tubular body member, said second seal comprising one or more "O" rings located in one or more respective grooves within an interior wall of the tubular body member; and

a valve body which cooperates with said valve seat, said aperture being closed by said valve body to prevent gas from passing from the vial into said tubular body member until said valve body is displaced along a valve axis by contact with the gas sampling device inserted into said tubular body member through said second seal by displacement along said sampling axis, thereby allowing gas to pass from the vial into said tubular body member and the gas sampling device, wherein said valve axis and said sampling axis are disposed so that the valve prevents the gas sampling device from being inserted into the vial.

2. A vial closure device as claimed in claim 1, wherein said valve body is biased in contact with said valve seat by a spring.

3. A vial closure device as claimed in claim 1, wherein an exterior portion of said tubular body member is provided with a flange which overlaps the top of the vial when said tubular body member is located in the vial mouth, and wherein said first seal comprises a sealing washer disposed between the vial and said flange,

and wherein said tubular body member is securable to the vial by a threaded retaining ring passed over said tubular body member and engaged with threads on an exterior of the vial.

4. A vial closure device as claimed in claim 1, wherein said first seal comprises a tapered surface on the tubular body member for engaging with a tapered socket on the vial.

5. The combination of a vial and the vial closure device of claim 1.

6. A vial closure device for closing a mouth of a vial which in use contains one of a gas or a vapor to be analyzed by extraction through a gas sampling device which is connectable to an analytical instrument and is displaceable along a sampling axis, said vial closure device comprising:

a tubular body member having opposite ends and locatable in the mouth of the vial, said tubular body member having at one end an aperture through which gas may pass from the vial into said tubular body member, said tubular body member further comprising a valve seat;

a first seal comprising a tapered surface on the tubular body member for engaging with a tapered socket on the vial, the first seal for making a substantially gas-tight seal between said tubular body member and the vial;

a second seal arranged at the other end of said tubular body member for providing a gas-tight seal around the gas sampling device inserted through said second seal into said tubular body member; and

a valve body which cooperates with said valve seat, said aperture being closed by said valve body to prevent gas from passing from the vial into said tubular body member until said valve body is displaced along a valve axis by contact with the gas sampling device inserted into said tubular body member through said second seal by displacement along said sampling axis, thereby allowing gas to pass from the vial into said tubular body member and the gas sampling device, wherein said valve axis and said sampling axis are disposed so that said valve body prevents the gas sampling device from being inserted beyond said valve body into the vial.

7. A vial closure device as claimed in claim 6, wherein said valve body is biased in contact with said valve seat by means of a spring.

8. A vial closure device as claimed in claim 6, wherein said second seal operates to close an interior of said tubular body member in the absence of a gas sampling device to make the interior of said tubular body member substantially gas-tight.

9. A vial closure device as claimed in claim 8, wherein said second seal comprises a septum.

10. A vial closure device as claimed in claim 6, wherein said second seal comprises one or more "O" rings located in one or more respective grooves within an interior wall of the tubular body member.

11. The combination of a vial and the vial closure device of claim 6.

12. A vial closure device for use with a vial having a mouth and defining an interior and also with a gas sampling device, comprising:

an elongated body member having opposing first and second ends, the first end defining a first aperture therein, an outward facing surface of the first end forming a valve seat, the second end defining a second aperture therein, an internal wall connecting the first and the second apertures to define an elongated internal cavity within the body member;

a first seal comprising a gasket between the body member and the vial or tapered surfaces on the body member and the vial, the first seal for making a substantially gas tight seal between the vial and the body member,

a valve spindle disposed within the internal cavity for longitudinal movement through the first aperture between a biased sealing position and an open position;

a valve body connected to the valve spindle, the valve body engaging the valve seat to make a substantially gas tight seal when the valve spindle is in the

sealing position and allowing gaseous communication between the vial interior and the internal cavity when the valve spindle is displaced from the sealing position;

a second seal comprising an O ring disposed within the internal cavity or a septum for making a substantially gas tight seal between the gas sampling device and the body member;

wherein the gas sampling device can be slidably inserted through the second end aperture and the second seal and along a sampling axis within the internal cavity toward the first end and the valve prevents the gas sampling device from being inserted into the first aperture.

13. A vial closure device as claimed in claim 12, wherein the gas sampling device can be slidably inserted through the second end aperture and along the sampling axis within the internal cavity toward the first end to a purge position to make a substantially gas tight seal between the gas sampling device and the internal cavity without moving the valve spindle from the sealing position and the gas sampling device can be slidably inserted along the sampling axis past the purge position toward the first end to a sampling position to displace the valve spindle toward the open position to allow the gas sampling device to withdraw a gas sample from the vial.

14. A vial closure device as claimed in claim 12 wherein the first seal comprises the gasket and the second seal comprises the O ring.

15. A vial closure device as claimed in claim 12 wherein the first seal comprises the gasket and the second seal comprises the septum.

16. A vial closure device as claimed in claim 12 wherein the first seal comprises tapered surfaces on the body member and the vial and the second seal comprises the O ring disposed within the internal cavity.

17. A vial closure device as claimed in claim 12 wherein the first seal comprises tapered surfaces on the body member and the vial and the second seal comprises the septum.

18. A vial closure device as claimed in claim 12 wherein the body member comprises a circumferential flange which overlaps a top of the vial when the body member is disposed adjacent the mouth of the vial, the first seal comprises the gasket disposed between the mouth of the vial and the flange, and wherein the body member is securable to the vial by a threaded retaining ring passed over the body member and engaged with threads on an exterior vial surface.

19. A vial closure device as claimed in claim 12 wherein the body member is made from metal.